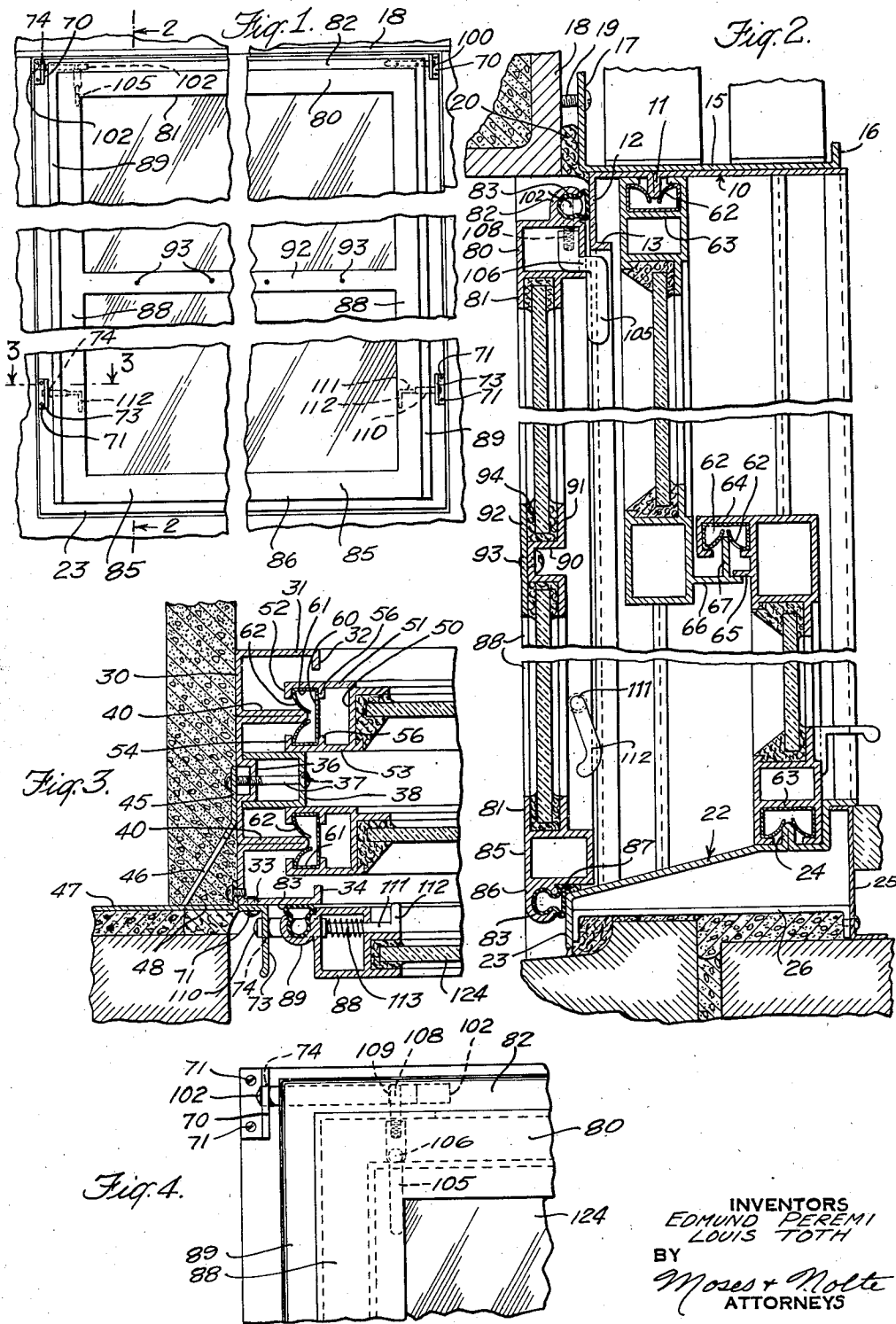


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WINDOW CONSTRUCTION  
Filed Dec. 5, 1938

2,278,666

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

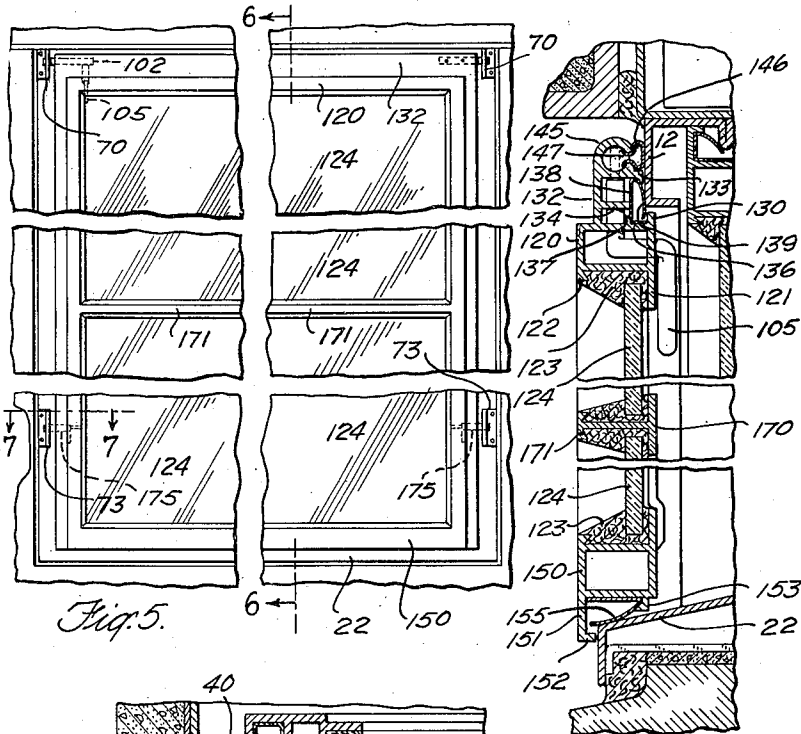


Fig. 5.

Fig. 6.

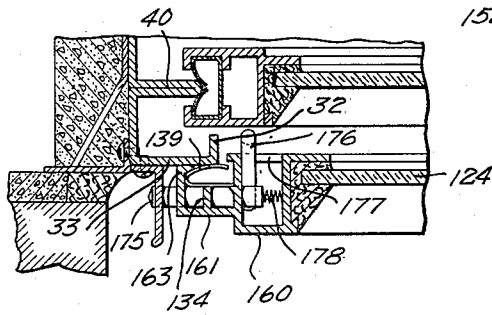


Fig. 7.

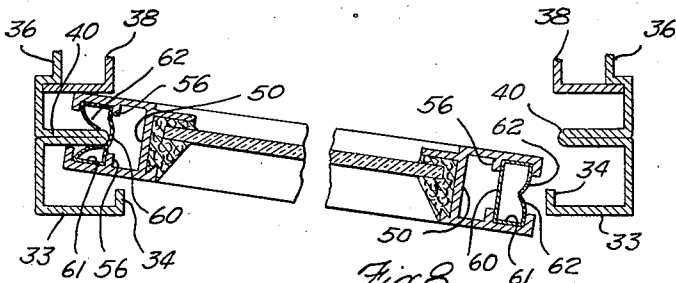


Fig. 8.

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# UNITED STATES PATENT OFFICE

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## WINDOW CONSTRUCTION

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7 Claims. (Cl. 189-64)

This invention relates to window construction and one of the objects of the invention is to provide an improved construction of frame and sliding sash suitable for double hung and similar windows.

Another object of the invention is to provide an improved storm sash construction applicable to windows generally, but particularly applicable to metal windows of the sliding or double hung type. Other objects and advantages will appear from the following detailed description of certain preferred embodiments of the invention chosen to illustrate the principles thereof.

In the accompanying drawings,

Figure 1 is a front elevation of a window embodying the invention having a storm sash applied thereto;

Figure 2 is a vertical section on line 2-2 of Fig. 1;

Figure 3 is a horizontal section on line 3-3 of Fig. 1;

Figure 4 is an enlarged fragmentary front elevation of the upper left hand corner of the window shown in Fig. 1;

Figure 5 is a front elevation of a window having a modified form of storm sash applied thereto;

Figure 6 is a vertical sectional view taken on line 6-6 of Figure 5 through the storm sash and a part of the window frame and sliding sash;

Figure 7 is a section on line 7-7 of Figure 5, part of the window frame being omitted;

Figure 8 is a horizontal sectional view of a part of the window frame and a sliding sash showing the manner of removing the sash from the frame.

Referring to the drawings in detail, and particularly to Figures 1, 2, 3 and 4, the window frame shown comprises a header member formed of a rolled metal sheet 10 preferably of non-ferrous or non-corrosive metal which is folded between its ends to provide a rib 11 for engagement with the top rail of the upper sash, and at its edge towards the outside of the window with a flange 12 terminating in an inwardly directed lip 12. The header member 10 may be mounted upon, and reinforced by an angle plate 15 which may be of iron or of non-ferrous metal and which is preferably provided with an inner flange 16 and with a wide outer flange 17 which may be embedded in the masonry or attached to lintel 18, in any suitable manner as by screws or rivets 19. The angle plate 15 may, if desired, be spaced from the lintel 18 so as to provide a pocket for caulking material 20.

The sill of the window may be of any suitable form. For instance, as shown in Figure 2, it comprises a plate of non-ferrous or non-corrosive metal having an inclined apron 22 which terminates at its forward edge in a downwardly projecting flange 23. Near its inner edge the sill has a folded rib 24 for engagement with the bottom rail of the lower sash. This non-corrosive metal sill plate is preferably supported and reinforced by a flanged plate 25 and braces 26, which may be made of iron or of non-corrosive metal as desired.

The window jambs are preferably of the form shown in Figure 3 and each comprises a channel member 30 preferably made of non-ferrous or non-corrosive metal, said channel being provided with an inner flange 31 having a lip 32, and with an outer flange 33 having a lip 34. Substantially centrally of the bottom of channel 30 an inwardly projecting rib 36 is provided, and fitted over this and secured in any suitable manner, as by screws 37, is a channel-shaped parting strip 38. A pair of sash receiving channels is thus provided. Formed in the bottom of each of these sash receiving channels is an inwardly projecting sash guide rib 40 which is preferably of considerable width so that it projects well out from the bottom of the main channel member 30, and nearly as far as the lips 32 and 34. For reinforcing the jamb channel 30, a reinforcing plate 45 is preferably provided which is secured to the back of the channel 30 in any suitable manner, as by welding or by means of screws or rivets, and which comprises an angle web 46 and a flange 47, the latter being preferably parallel to the plane of the window. Braces 48, which may be punched out of web 46, connect the flange 47 with the flange 33 so as to hold the angle web 46 rigidly spaced from the channel at the proper angle. A very strong construction is thus provided which renders the jamb rigid and is adapted to interlock and bond the masonry.

The sashes comprise stiles which may be extruded from aluminum, or bronze or other suitable metal, each stile having a base 50 suitably formed to hold a pane of glass and carrying an inside flange 51 terminating in a lip 52 and with an outside flange 53 having a lip 54. Inwardly projecting from the flanges 51 and 53 are intermediate ribs 56 which are located at a distance from the base 50 of the sash stile, for a purpose which will be explained. Mounted between the flanges 51 and 53 in the space defined between the lips and ribs on the flanges

is a resilient metal sash guiding and sealing strip which may desirably be formed of non-corrosive metal such as bronze or stainless steel, and which comprises a transverse base 50 supported on the ribs 56, side flanges 61 extending from the base to just below the lips 52 and 54 and inwardly directed resilient tongues 62 which are adapted to bear against the sash guiding ribs 40 with sufficient pressure to form a weather tight seal. The faces of the sash stiles adjacent to the parting strip 38 normally bear against the parting strip so as to form close metal to metal contact, and the seal thus effected, in addition to the seals effected by engagement of the tongues 62 with the guide rail 40, form a triple barrier against the weather. The sash, however, being held in position only by engagement with the resilient tongues, cannot bind, jam or rattle. The construction described permits removal of a sash either by sliding the resilient sealing member endwise out of its recess in the sash stile, or, if desired, the sash may be taken out without removing any part by simply forcing the sash laterally in the plane of the glass to an extent sufficient to permit one stile of the sash to clear the lip 32 past the edge of the guide rib 40, whereupon the sash may be removed. Owing to the space between the base 50 of the sash stile channel and the base 60 of the guiding and sealing member, the latter can be sprung sufficiently to permit the necessary lateral movement of the sash, as clearly shown at the left hand side of Figure 8.

The top rail of the upper sash comprises a hollow extruded section, preferably having a partition 63 across the same which supports a resilient metal weather sealing member similar to that used in the stiles of the sash, and which is adapted to engage the rib 11. When the sash is moved down so that the tongues 62 leave contact with the rib, the edges of the tongues spring together, thus closing the space in the channel below them against the entrance of dirt. The bottom rail of the lower sash is preferably of similar section to the top rail of the upper sash and carries a similar weather sealing member which engages with the rib 24. The meeting rail of the lower sash is preferably formed to provide a laterally projecting channel member 64 which is adapted to hold a weather sealing member of the same shape as those used elsewhere in the sashes. This meeting rail is also provided with a laterally projecting narrow flange 65.

The meeting rail of the upper sash is provided with a laterally projecting flange 66 adapted to engage under the flange 65 when the meeting rails meet, the flange 66 carrying an upwardly projecting rib 67 adapted to project between the tongues 62 of the sealing member so that a three point weather seal is provided at the meeting rails. The channel 64 and resilient sealing member are preferably carried on the meeting rail of the lower sash as shown, so that they will face downwardly and will not collect water and the springing together of the edges of the tongues 62 when the rib 67 is withdrawn from contact therewith by the opening of the window also helps to exclude dust, etc. It will be seen that the sealing members may be of like cross section throughout and that they are held in position on the sash members by the flanges of the sash, thereby dispensing with the use of screws or other fastening means. The weather sealing means may also be removed without de-

struction or dismantling the frame or destroying the sealing means themselves.

The storm sash construction shown in Figures 1, 2, 3 and 4 comprises a metal sash adapted to be fitted and sealed against the outside of the window frame and preferably secured in position by means permitting the sash to be swung outwardly from the bottom or to be readily removed in its entirety. For the purpose of engagement with the storm sash attaching means the window frame is preferably provided with vertical angle brackets 70 and 73 secured to the flanges 33 of the jamb members in any suitable manner as by means of screws or rivets 71. The upper bracket 70 is situated at the upper end of the storm sash and the lower bracket 73 may be near but not at its lower end. The projecting flange of each of the brackets 70 and 73 is provided with a perforation or socket 74. The sash comprises a top rail 80 which may desirably be formed of a hollow extruded shape and provided with glass receiving flanges 81 and with a longitudinally extending channel-forming member 82 adapted to receive a suitable packing, such as the tubular rubber packing 83, the exposed face of which is adapted to be flattened against the flange 12 of the frame. The bottom rail 85 of the storm sash is also shown as made of a hollow extruded shape and is provided with a member 86 forming an open sided channel for receiving the tubular rubber packing 83, though obviously any other resilient packing may be utilized, both here and in the other places where a tubular rubber packing is shown. It will be noted that, while the channel-forming member 82 at the top of the storm sash is located so that the packing engages the frame substantially in alignment with the inner face of the storm sash, the channel-forming member 86 is located nearer the outer face of the sash so that the packing therein engages the edge of the sill in a plane spaced outwardly from the inner face of the sash. A slight excess of packing is preferably provided to insure sealing at the corners. This excess will tend to be squeezed into the recess 87. The side stiles 88 of the storm sash are preferably provided with channel-forming members 89 adapted to receive packing members 83. It is also, in many instances, desirable to provide the storm sash with muntins, such for instance as the channel shaped muntin 90 illustrated, which is provided with glass supporting flanges 91, the glass being secured in position by a removable plate 92 attached to the muntin by screws 93 or in any other suitable manner. Suitable packing 94 may be provided between the glass and the flanges.

Any suitable means for mounting and securing the storm sash in position may be employed, but we prefer to use the construction shown in which a pivot 100 is fixed to one of the upper corners of the storm sash and engaged with one of the sockets 74 in the adjacent flanged member 70. At the opposite upper corner of the storm sash is mounted a sliding bolt 102 which is arranged to slide in a recess in the sash and to be moved into or out of the corresponding socket 74. The pivot 100 and bolt 102 may if desired be mounted in the recessed ends of the channel-forming member 82. As the bolt 102 is preferably mounted as near as possible to the upper edge of the storm sash, it is desirable to provide a means within easy reach of an operator inside of the building for advancing or retracting the bolt. For this purpose a pivoted op-

erating lever 105 is provided which has a horizontal bent portion 106 passing through a hole in the inner wall of the top rail of the storm sash, and constituting a pivot for the lever. The upper end of the lever carries a pin 108 engaging loosely in a hole 109 near the inner end of the bolt 102. By swinging the lower end of the lever 105 the bolt may be advanced or retracted. The lower end of the lever 105 projects downwardly below the bottom of the flange 12, where it may be easily manipulated if the upper sliding sash is moved down.

On each of the side rails of the storm sash opposite the corresponding sockets 74 in the flanged members 73, retractable sliding bolts 110 are mounted which have stems 111 projecting inwardly and terminating in finger pieces 112 which may be conveniently reached when the lower sliding sash is raised. The bolts 110 are normally held in projected position by springs 113. By retracting the bolts 110, it will be seen that the window may be swung outwardly about the fixed pivot 100 and the upper sliding bolt 102. If it is desired to remove the sash entirely, the bolt 102 may be retracted whereupon by tilting the window slightly, the pivot 100 may be slipped out of its socket. When the bolts are all engaged, the storm sash is held firmly in position, and a packed joint is formed all the way around the same.

Referring to Figures 5, 6, and 7 the main window construction illustrated is the same as that already described. A modified form of storm sash is shown, however, in which resilient metal packing is used throughout. The storm sash is shown as formed of special extruded metal shapes, the top rail of the sash comprising the tubular member 120, which is provided with glass supporting flange 121, and with an overhanging or dove-tailed shaped lip 122 adapted to retain the putty 123 which holds the glass 124. The inner face of the tubular top rail 120 is provided with a narrow flange or lip 130, and projecting from the top of the tubular member 120 is a wide flange 132 which carries an overhanging portion 133 and which also carries an intermediate flange or rib 134. A bent resilient metal weather strip, preferably formed of bronze or stainless steel or other non-corrosive metal, has a flange 138 which rests against the edge of the rib 134, and bent downwardly from the upper edge of the flange 138 is a resilient tongue 139 which bears against the flange 12 of the window frame. The tongue 139 is flexible and preferably has an unfinished, that is a raw or unreinforced edge, so that it possesses a certain amount of flexibility in a longitudinal direction. This permits the tongue to seal firmly throughout its length against the flange 12, notwithstanding possible unevenness in the latter. When the storm sash is removed from the window, the edge of the flexible tongue is protected by the flange 130. As an additional seal against entrance of water at the top of the storm sash, the flange 132 may carry a member 145 forming an open sided channel adapted to receive a resilient packing strip 146 which may be of bent metal with hook-shaped flanges 147 adapted to engage in the mouth of the open channel formed in member 145. Obviously a tubular rubber packing such as the packing 82, already described, or any other suitable packing may be used in place of the resilient metal packing strip 146.

The bottom rail of the storm sash comprises a tubular member 150 formed at one side to re-

ceive the glass, and provided at its outer margin with a flange 151 terminating in a lip 152 and provided near its inner edge with an overhanging lip 153. A resilient metal packing strip is mounted between the flange 151 and the lip 153, said packing strip having a flexible tongue 155 adapted to bear upon the inclined portion 22 of the window sill. The side stiles of the storm sash comprise tubular members 160 which carry outwardly projecting flanges 161 having overhanging lip portions 163, the formation being similar to that shown in connection with the top rail, except that the channel forming member 145 and packing are omitted. A resilient metal packing strip similar to that shown in the top rail is utilized, the packing strip having a flexible tongue 139 adapted to bear against the flange 33 of the window jamb. For mounting the storm sash in position, any suitable means may be used, such as an arrangement of bolts similar to that described in connection with the previous figures. The sliding bolts near the lower part of the sash are preferably of slightly different form from the bolts 110 previously described. As shown particularly in Figure 7, the sliding bolts which are marked 175 do not have stems 111, but have holes near their inner ends in which are fixed finger pieces 176 which project laterally through slots 177 in the inner walls of the side rail members 160. Compression springs 178 are used to hold the bolts 175 in normally projected position.

While we have illustrated and described in detail certain preferred forms of our invention, it is to be understood that changes may be made therein and the invention embodied in other structures. We do not, therefore, desire to limit ourselves to the specific construction illustrated, but intend to cover our invention broadly in whatever form its principle may be utilized.

We claim:

1. A storm window comprising top, side and bottom rails of hollow metallic construction, said top rail having on the inner edge of its upper surface a narrow upwardly extending flange, a wide flange near the outer edge thereof, and an intermediate rib, said wide flange ending in an overhanging portion, said wide flange having an intermediate inwardly extending flange, forming with said overhanging portion a recess for packing, said intermediate flange terminating in a slightly downturned lip, an inwardly extending rib between said inwardly extending flange and the upper surface of said rail, and a V-shaped resilient metal weather strip member held on said rail, one leg of the V being held by said intermediate rib and said inwardly extending rib, the vertex of said V engaging beneath said lip, and the other leg of the V being a resilient tongue held against unlimited outward movement by said narrow upwardly extending flange of the upper surface of said rail.

2. A storm window comprising top, side and bottom sash rails of hollow metallic construction, said bottom rail including a downwardly extending short inner flange terminating in an outwardly turned lip, and a downwardly extending outer flange terminating in an inwardly turned rib, and a resilient metallic angular weather strip held by the bottom of said rail and said flanges, the base of said strip engaging the bottom rail between said flanges, and forming an angle with a free resilient portion of said strip, said angle being engaged by said outwardly turned lip of said short inner flange, the free

end of said strip resiliently engaging said inwardly turned rib of said outer flange.

3. A storm window comprising top, side, and bottom rails of hollow metallic construction, said side rails comprising a short laterally extending inner flange, an intermediate rib, and an outer laterally extending flange, said outer flange terminating in an inwardly extending flange having an overturned lip, a rib intermediate said outer flange and the side of said rail, and a V-shaped resilient metallic weather strip, one leg of the V being held by said intermediate rib on said rail member and said intermediate flange on said outside flange, the angle of the V being held by said overturned lip, and the other leg of the V being engaged by said inner flange on said rail member and being adapted to be moved away from engagement with said flange when pressure is applied thereto.

4. The combination with a storm sash having top, side and bottom rails and a light, of channel shaped members on the outer sides of said rails, the open portion of the channel facing inwardly, the base of said channels accommodating bolts which extend away from the window in a plane parallel to the plane of the light and resilient metallic weather stripping members shallowly mounted in said channels inwardly of

said bolts providing a sealing surface on all four sides of the window.

5. The combination with a window frame having socketed members mounted rigidly thereon and a storm sash including top, side and bottom rails and inwardly facing channels on said rails, of spring pressed slide bolts mounted in said channels in a plane parallel to the plane of the window, said socketed members engaging one end of said bolts and resilient metallic weather stripping mounted in said channels on said top, side and bottom rails between said bolts and said frame and bearing against said frame.

6. The combination as claimed in claim 5 in which said bolts terminate at their ends remote from said socket engaged ends in finger pieces accessible from the inside of the window.

7. The combination as claimed in claim 5 wherein a bolt and its corresponding socket member are situated near the top of either side rail of said storm sash so that said bolts and sockets act in the manner of hinges permitting the window to be swung out of its position in said frame to any desired position about said bolts as pivots.

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